

Acceleration Lab

Name _____ Date _____ Group _____ Period _____

In the last activity you calculated the average speed of the car. You discovered that the speed was increasing as the total distance traveled was increasing. In this activity we will determine the instantaneous speed of the car at several places as it rolls down the ramp.

Problem: If you increase the distance from the top of the ramp where the speed is measured, what will be its effect on the speed of the car?

Hypothesis: If _____

Variables: By the time you finish this experiment, you will need to identify the different types of variables present in this investigation. Consult your notes for definitions of the types of variables.

Independent Variables: _____


Dependent Variables: _____

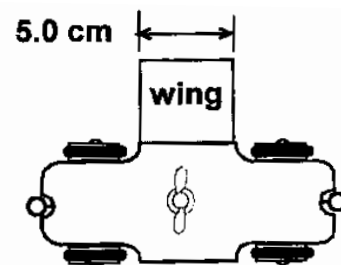
Controlled Variables: _____

Set up:

- Put either 1 or 2 weights on the car.
- Use the 6th hole from the bottom of the stand.
- Attach one Clamp to input A of the Timer and turn the **A** light on so the Timer shows the time (t) that the beam is broken in Clamp A. Remember to set the Timer in **interval** mode.
- As the Car passes through the Clamp the Timer starts and stops. The Timer measures the time that the light beam was broken. The Car moves a distance equal to the width of the wing while the light beam is broken.
- While the Timer is counting, the Car moves a distance exactly equal to the width of the wing. This is because it is the wing itself that starts and stops the Timer.

The **distance traveled** is the **width of the wing (5 cm)** and the time taken is the time from Clamp A. The speed is then:

 speed = $\frac{5 \text{ cm}}{\text{time from clamp A}}$



Procedures:

- Put the Clamp on the Ramp and use a ruler to measure where it is. Measure from the top of the Ramp to the edge of the photogate.
- Roll the Car down. Be sure to start the Car from the highest place it will go for all trials.
- Calculate the speed of the Car from the time measurement you get from Clamp A.
- Move the Clamp a palm span lower down the ramp and repeat the above steps.
- Repeat the above for a total of 4 different places on the Ramp.
- Compare your data with the rest of your group before calculating the speed.
- After calculating the speeds, compare them with the rest of your group **before** plotting them on the graph.
- Once you've plotted your data on the graph, position one graph exactly over another graph and if there are any notable differences in the position of the points, check them again for accuracy.

Title _____

USE PENCIL ONLY ON GRAPHS!

Make small points for your graph with a small circle around each point like this: ⊙

Draw a straight, best-fit line after all points are plotted

